National Aeronautics and Space Administration

AEROSPACE Frontiers

VOLUME 12 ISSUE 5 MAY 2010

FY 2011 Budget Request Pending Approval

NASA Announces New Work Assignments

C-2010-1478

C-2010-1469

C-2010-1479 Photos by Marvin Smith

Pictured clockwise: Lugo during the All Hands; Lugo and The Plain Dealer *reporter Tom Breckenridge during the media briefing; and Dr. Geoffrey Landis asking a question during the All Hands.*

NASA Administrator Charles Bolden and Deputy Administrator Lori Garver presented an outline for new and extended program assignments across the agency on April 8 in support of the President's fiscal year (FY) 2011 budget request.

Pending congressional approval, NASA will create new program offices that include activities in exploration technology and development, heavy lift rockets and rocket propulsion technology, exploration precursor robotic missions, human research and commercial spaceflight opportunities.

Under this budget, Glenn would gain responsibilities in the following areas:

• **Exploration Technology Development and Demonstration Program:** New Program Office would manage $223 million in FY 2011 and $1.8 billion over the next 5 years to mature key exploration technologies through laboratory, ground and flight tests.

• **Space Technology Research Grants:** New Program Office would manage $70 million in FY 2011 and $350 million over 5 years to support fundamental research and graduate studies in key aerospace-related disciplines.

Continued on page 3

Agreement with NASA and City of Cleveland

Collaboration Focuses on Homeland HazMat "Safety and Security"

NASA Glenn and the City of Cleveland have entered into a Space Act Agreement for the "Design and Development of a Robotics Platform and Communications Test Bed." This partnership could lead to safer protocols for fire personnel and other first responders.

Glenn has begun transferring a prototype mobile sensing system, designed by the center's Mobile And Remote Sensing (MARS) Laboratory, to the Cleveland Division of Fire for a 6-month test trial. The system, named MARSHA (MARS Hazmat), addresses real-time secure and wireless long-distance communications. The agreement partners the Cleveland Fire Department with the MARS Laboratory and other Research and Technology Directorate personnel to test the system in a variety of hazardous situations, and record and report the results.

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Inside

Straight *from the* Director

Keeping you informed

Ramon "Ray" Lugo
Acting Director

I want to periodically take some time, slow down and communicate with the center on topics and issues which may be of general interest to the community as a whole. I will likely use a number of different mediums to do this. In doing so, my hope is that you will get to know me, understand what I hold dear—and most importantly—trust me to lead the center through the times ahead.

When Dr. Whitlow announced my appointment as Acting Director during his All Hands Meeting 2 months ago, there was a lot going on throughout NASA. The Administrator had just announced several leadership changes at various field centers, including Glenn, and the entire NASA Family continued to anxiously await any news about our possible work assignments as part of the President's FY11 Budget Proposal. Although I made a few comments during this All Hands Meeting, I regret that I did not take more time to present my thoughts and feelings about my new role to the workforce.

It is important to me to be timely in sharing news and information; having said that, I am aware of the consequences of what happens when I don't communicate with you. Please know that I am committed to sharing news and information with you, and am open to receiving your comments, questions and concerns.

I am truly inspired by the work you do at Glenn Research Center, and am optimistic about our future with the proposed work assignments Administrator Bolden announced last month. Through your efforts and can-do attitude, we are destined to do good work and accomplish our new goals and objectives.

As with any new voyage, it takes some time to get your "sea legs." I truly appreciate your patience as I have gotten mine and adjusted to these new waters. Thank you.

Robotics Communications Test Bed

Continued from page 1

The partnership stems from a 2008 meeting that the Cleveland Fire Department attended at the MARS Laboratory at Glenn. During a demonstration, Glenn showcased robots performing tasks identified as critical by the Department of Homeland Security. To date, the MARS team has demonstrated the system at two down-town locations, including the Cleveland Browns Stadium.

"During the demonstrations, the Cleveland Fire Department personnel were intrigued by Glenn's robotics and sensor technologies, which could be used to respond to chemical, biological, radiological, nuclear, explosive and hazardous materials threats," said MARS Lab Lead Engineer Mike Krasowski, Optical Instrumentation and NDE Branch.

Prior to this agreement, Glenn's MARS Lab studied robots currently available to first responders and found them very expensive, offering limited communications capabilities, and still requiring first responders to wear protective gear and hand carry sensor systems into hazardous situations. Consequently, MARS personnel designed a mobile sensor platform that is reliable yet expendable, and can support a variety of video, communication and sensor systems that put a safe distance between the first responder and the hazardous situation. The majority of the sensing systems carried by the vehicle are those normally hand carried onto the scene of the threat and allow a remote operator inside the fire department's HAZMAT truck to take measurements from a safe distance. Video and sensor snapshots are available to third parties over the Internet in near real time.

Lt. Terry Bindernagel of the Cleveland Fire Department, who approached Glenn initially seeking a communication package, was impressed by the additional capabilities. "The fact that we can use a remote means to obtain and send readings to other agencies is extraordinary," Bindernagel said.

Krasowski said many in the safety and HAZMAT community are eagerly awaiting field test results from this partnership, hopeful that the MARS Laboratory's capabilities and open architecture designs will provide a new process for first responders.

The prototype robot was developed with support from the Innovative Partnerships Program and the Research and Technology Directorate at Glenn.

Left: MARSHA could put a safe distance between first responders and hazardous situations.

Safety Stand-Down/ Safety Awareness Day

On May 20, NASA Glenn will host a Safety Stand-Down/Safety Awareness Day, where every employee of the NASA family will be reminded that "SAFETY Starts With YOU." The event provides a full day of safety awareness, training, safety demonstrations and discussions for civil service and contractor employees. The day starts at 7:15 a.m. with registration and the keynote speaker in the Hangar. The Golden Shoe Award will be presented at 11:45 a.m. and followed by lunch. Safety Awareness activities will be held in the afternoon.

Proposed Assignments Position Glenn Well for Future

Continued from page 1

• **Aeronautics Research:** The FY 2011 funding augmentation will be used to increase research activities into green aviation and Next Generation Air Transportation System (NextGen) capabilities.

"These are significant assignments to NASA Glenn, and reflect a level of confidence in our ability to perform these tasks," affirmed Acting Center Director Ray Lugo.

Lugo met with employees and local media on April 9 to discuss Glenn's role in implementing the exploration initiatives. He explained that over the last few months, agencywide teams had been providing information to formulate the assignments. He thanked Glenn team members Harry Cikanek, Carolyn Mercer, Claudia Meyer and Mike Patterson, who gathered and formulated Glenn's contributions to present to Headquarters.

"Their work, with support from a lot of people at the lab, made sure Glenn was well represented in the process," he said.

Lugo said these assignments would ensure that Glenn continues to provide vital technology solutions that will enable the revitalization of our nation's space industry and inspire the next generation of explorers. He expects additional assignments to be made over the coming months with more work ahead to define the missions and projects within each of the programs.

Lugo reminded employees that these assignments are subject to approval from Congress, and expected employees to continue working on their current projects.

"We're working formulation for these new programs that may come our way, but we have to keep our eye on the ball," he said. "Until Congress weighs in, Constellation is the program of record and we have to continue on."

Lugo stressed that the proposed work assignments, lead responsibilities and opportunities to perform work in support of other centers position Glenn well, and that they provide a sense of stability that is vital to the future of the center.

"There's a lot to be said about stability," he said. "When all is said and done, we should have a healthy center."

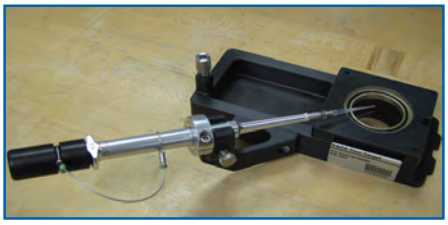
For details on the NASA center work assignments and more information about the agency's FY2011 budget, visit http://www.nasa.gov/budget.

—BY DOREEN B. ZUDELL

STS–131

Glenn Sent Four Experiments to ISS

C-2009-4816 Photo by Michelle Murphy



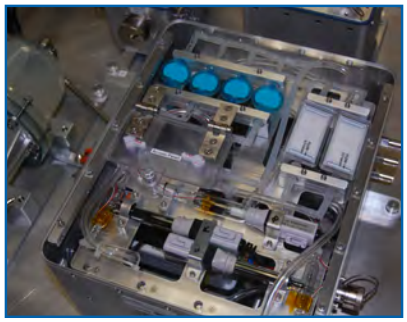
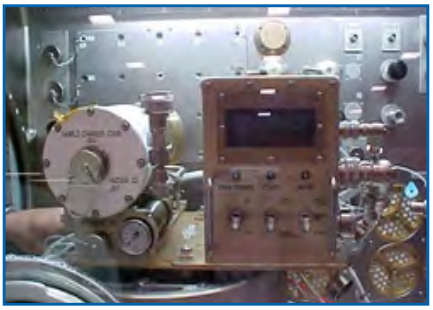


Photo by Dan Brown



Glenn experiments, pictured clockwise: CFE Vane Gap 1, one of four CFE-2 experiment flight vessels; PACE oil dispenser and test target assembly; IVGEN purifier assembly; and CSLM–2R experiment configuration inside the Microgravity Science Glovebox.

Four space experiments designed, fabricated, tested and managed by NASA Glenn researchers, flew aboard the space shuttle and onto the International Space Station (ISS) last month.

Discovery carried a multipurpose logistics module filled with science racks for the laboratories aboard the ISS.

The four experiments Glenn sent to the ISS via STS–131 include:

Coarsening in Solid Liquid Mixtures-2 Re-flight (CSLM–2R). Principal Investigator: Peter Voorhees and Project Manager: Robert Hawersaat

Capillary Flow Experiment-2 (CFE–2). Principal Investigator: Dr. Mark Weislogel and Project Manager: Donna Bohman

IntraVenous Fluid Generation (IVGEN). Principal Investigator: John McQuillen and Project Manager: DeVon Griffin

Preliminary Advanced Colloids Experiment (PACE). Project Manager: Ron Sicker, ZIN Technologies and Project Manager: Tibor Lorik

In addition to transporting science experiments, the STS-131 mission included three spacewalks that replaced an ammonia tank assembly, retrieved a Japanese experiment from the station's exterior and switched out a rate gyro assembly on a segment of the station's truss structure.

For details on each experiment, visit http://www.nasa.gov/centers/glenn/news/pressrel/2010/10-024_sts131.html.

News and Events

Planetary Science Director Visits

NASA's Director of Planetary Science Dr. James Green toured several Lewis Field and Plum Brook facilities last month, met with center leaders to discuss Glenn activities and capabilities related to planetary science and spoke at the Ohio Aerospace Institute on the recent discoveries made in planetary science by NASA missions and Glenn technologies. Pictured: Dr. Hani Kamhawi, principle investigator for the High Voltage Hall Accelerator Hall Thruster project, left, explaining the advanced propulsion activities and benefits of the project to Green, right.

C-2010-1106 Photo by Marvin Smith

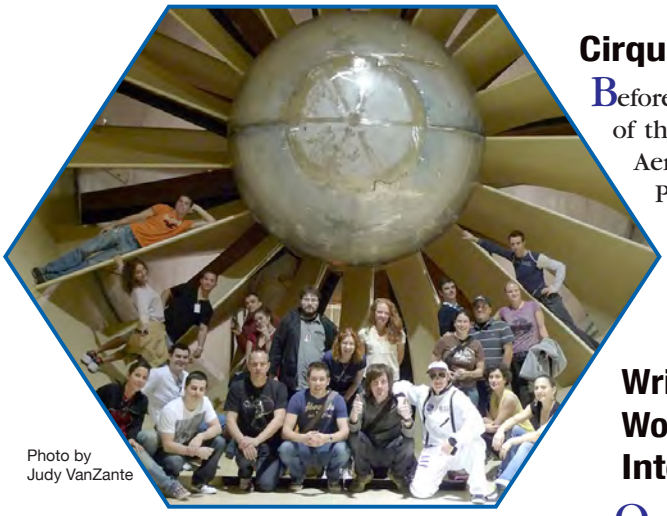


Photo by Judy VanZante

Cirque du Soleil Troupe Tours

Before performing at the Wolstein Center in Cleveland last month, 28 members of the dynamic Cirque du Soleil entertainment company visited Glenn's Aero-Acoustic Propulsion Laboratory and Icing Research Tunnel (IRT). Pictured are Cirque du Soleil performers in the IRT fan.

Writing Women Back Into History

C-2010-1412 Photo by Michelle Murphy

On March 24, NASA Glenn's 2010 Women's History Month celebration and annual Federal Women's Program Awards ceremony highlighted the contributions of women in shaping our nation, and honored those who are inspiring women at Glenn to write new chapters. Cathy Norton, noted entrepreneur and philanthropist (pictured), and Toni Mullee, executive director, International Women's Air & Space Museum, were guest speakers. The event was sponsored by Glenn's Women's Advisory Group.

Photo courtesy of NASA Glenn's Developing Professionals Club

Yuri's Night 2010

On April 10, nearly 250 Cleveland-area space fans celebrated Yuri's Night hosted by NASA Glenn's Developing Professionals Club at the Great Lakes Science Center. Partygoers at 223 events in 67 cities across 7 continents united, via webcast, to celebrate human achievements in space near the anniversary of Yuri Gagarin's first space flight (April 12, 1961) and the first shuttle flight 20 years later. Pictured above is EVA, the inflatable astronaut (Analex's Mac Zborowski) leading the exuberant Cleveland crowd in a Conga line.

Photo by John Oldham

Outreach on Air and Sea Museum

Glenn personnel climbed aboard the Intrepid Sea, Air & Space Museum in New York City to participate in Kids Week in February. Glenn's Thomas Benson, Frederic Holland, Dennis Stocker and the Glenn Exhibits Team supported the event by overseeing a variety of lively presentations, science demonstrations and interactive exhibits at this National Historic Landmark. Pictured is Stocker using a mini version of a droptower to demonstrate microgravity.

Pietravoia Leads Office of Human Capital Management

Pietravoia

Lori Pietravoia has been named chief of NASA Glenn's Office of Human Capital Management, effective March 14.

Pietravoia leads a staff of 35 and manages the full range of human capital management requirements for Glenn. This includes civil service staffing, recruitment, placement, benefits, employee relations, employee development and organizational consulting as well as negotiation and administration of collective bargaining agreements.

Pietravoia has most recently performed duties as acting supervisor of Glenn's Logistics and Technical Information Division and chief, Human Capital Consultant Branch. Since beginning her NASA career at Glenn in 1990, she has served as supervisory human resources specialist, classification specialist and human resources specialist as well as employee and labor relations officer.

Prior to coming to Glenn, Pietravoia worked for the Defense Logistics Agency, Defense Contract Administrative Services Region in Cleveland. She has received NASA's Exceptional Service Award and earned a bachelor's degree in sociology from John Carroll University.

Off the Clock

Cochran's Hobby is a Great Fit

Photo by Doreen B. Zudell

Cochran stands by a few of her many 3-D and flat jigsaw puzzles in building 500.

When faced with a task, you may wonder how it will all come together. Jane Cochran, a contract specialist in the Procurement Division, makes all the pieces fit—on the job and during her leisure time.

Cochran, who has enjoyed making jigsaw puzzles since childhood, has produced an impressive collection of flat and three-dimensional (3-D) puzzles over the years. Some of these creations are on display in her office and in a shared office down the hall in building 500.

About 30 flat and 3-D puzzles, depicting famous locations/attractions such as the U.S. Capital, Eiffel Tower, Graceland, St. Peter's Basilica and Mont Saint-Michel, as well as a colorful sampling of Thomas Kinkaid cottages and gazebos, sit atop filing cabinets in the shared office. Cochran's own office holds about 20 other puzzles, including a striking 24-foot flat reproduction of the July 21, 1969, New York Times front page that featured the first walk on the moon. Several space-related puzzles align the hallway as well.

"Puzzle-building is a hobby you can do on your own or with others," Cochran explained. "It's a good way to improve your focus and patience skills, and a great distraction from something that may be weighing on your mind. There's a real sense of accomplishment when the puzzle is completed."

Very soon, Cochran will relocate as many of her puzzles as possible to her new office space in building 60, so co-workers can continue to enjoy her creations. Although she may have to downsize her office collection, she has no plans to downsize her puzzle-making hobby.

"Many of the puzzles I've chosen are places I've visited or would like to visit," she said. "I've been to 32 countries so far."

Cochran's not sure what's next on her travel itinerary, but she's currently working on a 3-D jigsaw of the Taj Mahal.

—BY DOREEN B. ZUDELL

ISS Collier Award Winner

The National Aeronautic Association (NAA) has selected the International Space Station (ISS) for the prestigious 2009 Robert J. Collier Trophy. Walter Boyne, chairman of the NAA, cited: "...[it] is a wonderful example of what the Collier Trophy signifies: accomplishment, vision and advancement in aerospace."

Summer Tours

Glenn invites the general public to tour its laboratory and testing facilities on the first and third Saturday of each month this summer. Tours are free to all ages and available to U.S. citizens and foreign national students in grades K–12. A bus will start the tours from Glenn's Briefing Center at 10:30 a.m. and run every hour with the last tour departing at 1:30 p.m. The June tours include: June 5—Abe Silverstein Wind Tunnel and June 19—Zero Gravity Research Center. For further information and list of all tours, or to reserve a spot, call 216-433-9653 or visit http://visit.grc.nasa.gov.

People

The Northeast Ohio Technology Coalition (NorTech), in partnership with *Crain's Cleveland Business,* presented the 2010 NorTech Innovation Award in Instrumentation, Controls and Electronics to NASA Glenn's **Dr. Félix Miranda** and **Dr. Rainee Simons**, Communications, Instrumentation & Controls Division. The award recognizes their work on "Radio Frequency Telemetry System for Implantable Bio-MEMS Sensors," a human health monitoring system that integrates a surgically implanted or ingested sensor with an external wireless telemetry system enabling the transfer of data remotely. NorTech awards honor the achievements of companies, nonprofit organizations, entrepreneurs and universities who have taken their creative concepts from vision to reality, while impacting everyday lives and transforming Northeast Ohio's global profile as an area for world-class technological advancement.

Dr. Miranda

Dr. Simons

Simon

Dr. Garg

The American Society of Mechanical Engineer's Turbo Expo Controls, Diagnostics, and Instrumentation Committee has selected the paper "Optimal Tuner Selection for Kalman Filter-Based Aircraft Engine Performance Estimation," coauthored by **Donald Simon** and **Dr. Sanjay Garg**, Controls and Dynamics Branch, as the 2009 Committee Best Paper. The award will be presented during the 2010 Turbo Expo in Glasgow, Scotland, in June.

Peter Tschen has been selected Flight Projects Area Manager in the Radioisotope Power Systems Program Office and will be responsible for overseeing integration of all flight projects in the program. Tschen previously served as chief of the Manufacturing Engineering and Process Branch, Manufacturing Division, where he led the manufacturing efforts for the Ares I–X Upper Stage Simulator.

Tschen

EHOVE Team Wins FIRST Buckeye Regional

The champion alliance of EHOVE Career Center, Milan, Ohio; Franklin High School, Franklin, Wis.; and Centerburg High School, Centerburg, Ohio, took first place out of 60 teams competing in the 2010 FIRST Buckeye Regional Robotics Competition, March 25–27. **Sierra Lobo, Inc. (SLI),** a NASA Glenn onsite contractor, was a sponsor and mentor for the EHOVE team, which also won the FIRST award for Innovation in Control sponsored by Rockwell Automation. SLI also sponsors the Machine Shop serving all the Buckeye Regional competitors. Pictured is SLI's Alex Yeckley, far left, who helped guide the EHOVE students in the design and build of their winning robot.

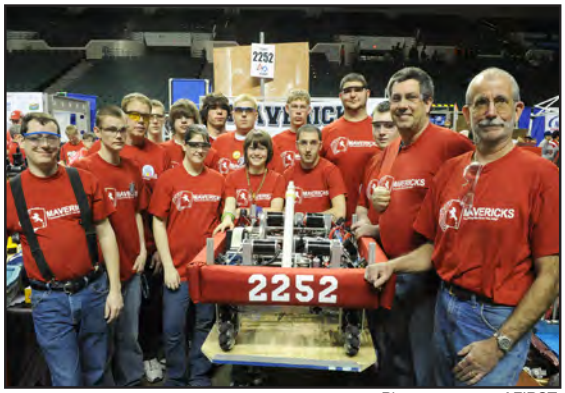


Photo courtesy of FIRST

Exploring Program Award

The Greater Cleveland Council of the Boy Scouts of America (BSA) has selected **Stephanie Brown-Houston** winner of the 2010 William H. Spurgeon III award. The award is the highest recognition for an individual or organization honoring their example of leadership to the Exploring Program, part of the BSA's Learning for Life career plan for young men and women age 14 through 20. As a member of the Educational Programs Office, Brown-Houston manages Glenn's Exploring Program that offers exploring activities in aeronautics, computer technology, human space exploration and balloon satellite communications.

Council Commissioner Stephanie Ricketts with Brown-Houston.

Retirements

Deb Cotleur, Office of Equal Opportunity Programs, retired on April 7, 2010, with 33 years of federal service, including 25 with NASA.

Lanny Thieme, Thermal Energy Conversion Branch, Power and In-Space Propulsion Division, retired on May 3, 2010, with 34 ½ years of NASA service.

Louis Bernhardt, Systems Management Branch, Facilities Division, retired on April 30, 2010, with 37 years of NASA service.

James Hunter, Applied Structural Mechanics Branch, Mechanical and Fluid Systems Division, retired on March 31, 2010, with 27 years of NASA service.

Bernhardt

Hunter

Calendar

EMPLOYEE WALK AND HEALTH FAIR: The annual Employee Step Out will include a health fair! Celebrate healthy living by grabbing a pair of walking shoes and stepping out on Wednesday, May 19, and then enjoy refreshments while talking with health and wellness vendors in the Employee Center. Employees can walk the 1.4-mile Taylor-Walcott loop anytime between 10 a.m. and 2 p.m., rain or shine. Chair massages, blood pressure, cholesterol and glucose screenings and education displays will be located inside the Employee Center. The Directorate or Office with the highest participation percentage will be awarded the annual Golden Shoe. POC: Fitness Center, 216-433-6313.

NASA RETIRED WOMEN'S LUNCH: The next luncheon will be held on Thursday, May 20 at noon at Coppertop at the Cherokee Hills Golf Course, 5740 Center Rd. (Rt. 303) in Valley City. Call Gerry Ziemba at 330-273-4850 to reserve a seat.

2010 ASIAN/PACIFIC AMERICAN HERITAGE EVENT: This year's event will be held on Friday, May 21, 10 a.m. to noon in the Administration Bldg. Auditorium. The keynote speaker will be Dr. Lawrence Quang, MD, medical director of the Greater Cleveland Poison Control Center and an instructor of pediatrics in the Division of Pediatric Pharmacology and Critical Care at Rainbow Babies & Children's Hospital. A wide variety of food samplings will be available after several cultural performances. More information can be found at http://www.grc.nasa.gov/WWW/AdvisoryGroups/APIAC.

DEADLINES

News items and brief announcements for publication in the June issue is noon, May 21. Larger articles require at least 1 month notice.

http://aerospacefrontiers.grc.nasa.gov

Hermes Award

WINNER 2008 APEX AWARDS FOR PUBLICATION EXCELLENCE

HELP TELL THE NASA STORY: Your help is needed to staff local and regional outreach events. Upcoming events include NASA Night at Progressive Field (May 22); North Coast Boating & Fishing Fest (June 11); National Cherry Festival in Traverse City, Mich. (July 2-4); and Duluth, Minn. Air Show (July 17-18). To learn more about staffing these events, visit http://outreach.grc.nasa.gov.

IFPTE LOCAL 28, LESA MEETING: LESA will hold its next membership meeting on Wednesday, June 9 at noon in the Small Dining Room of the Employee Center, building 15.

LLF GOLF OUTING: The annual Lewis Little Folks (LLF) golf outing will take place on Friday, June 25 at Bob-O-Links in Avon. All are welcome. For information, call 216-433-5264.

In Memory

Fallert

Norman Fallert, 72, who retired in 2005 with 43 years of service, died Dec. 8, 2009. Fallert began his long career at NASA in the Apprentice Program and graduated as a mechanical engineering technician. He retired from the Research Testing Division where he supported various organizations while working in a number of facilities including the Hangar, Drop Tower and 10- by 10-Foot Supersonic Wind Tunnel.

George Lampshire Jr., 82, who retired in 1982 with 35 years of federal service, died Sept. 9, 2009. Prior to retiring, Lampshire was head of the Inspection Section of the Fabrication Division. During his 25-year NASA career, Lampshire earned several awards, including one for modifying a blade profile machine to work in reverse. He also served as president of the center's AFGE Local 2182 Union. Lampshire was a 9-year veteran of the U.S. Army.

Irving Sheer, 90, who retired in 1986 with 22 years of NASA service, died Sept. 13, 2009. Prior to retiring, Sheer served in the Aeropropulsion Facilities and Experiments Division. Notable among Sheer's career awards was a Special Achievement Award (1984) for research on ADEN (augmented deflector exhaust nozzle) for the X-29 and an Awareness Award (1986) for the F-100 2DiCD Vectoring and Reversing Nozzle Project Team—all work towards advancing high-performance aircraft.

Dr. Leonard

Dr. Regis F. Leonard, 72, who retired in 1994 with 31 years of NASA service, died Feb. 23. Leonard was a physicist who began his NASA career working on the Cyclotron Cancer Treatment Program before transferring to the Space Electronics Division to lead the center's research and development of solid-state space communications technology, a forerunner to the Advanced Communications Technology Satellite. Leonard received the NASA medal for Exceptional Achievement (1993) for his contributions and leadership in that area. After retiring, Leonard created a satellite communications educational website for NASA to help science teachers and students, grades 7 to 12, and taught physics at Magnificat High School in Rocky River.

Hurst

Evert B. Hurst, 92, who retired in 1980 with 17 years of NASA service, died March 7. Hurst was an aerospace engineer whose expertise was in vibroacoustics. He worked in the pyrotechnic shock testing, critical to developing subsystems and full-scale systems that must withstand an explosive event, such as separating two stages in a multistage rocket. Hurst earned several NASA awards including a medal for Exceptional Engineering by improving acoustics on the Titan IV/Cassini mission, avoiding costly changes. After retiring, Hurst continued making contributions to NASA as a contractor supporting work on the Mars Observer spacecraft, the Geostationary Operational Environmental Satellite and other Atlas Centaur Rockets projects, until 1996.

National Aeronautics and Space Administration

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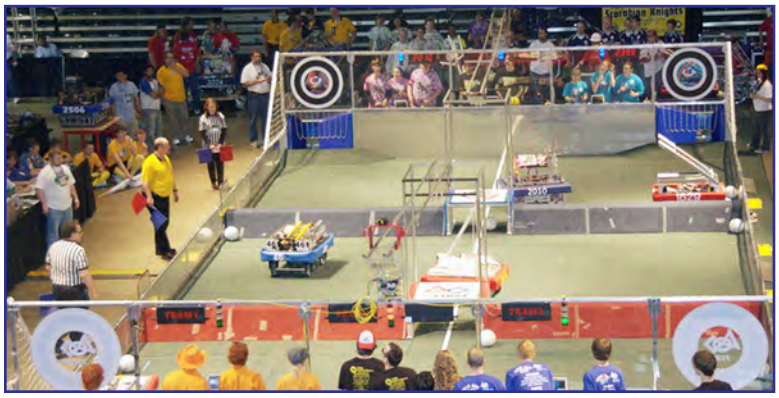
Glenn Employees Set the Stage for FIRST



FIRST' Breakaway™ Arena constructed by NASA Glenn volunteers for the Buckeye Regional Robotics Competition.

Photo by Tim Dedula

The quality of the playing field is a crucial element of any sporting event. It affects player safety and the flow of the game. For the past 6 years, Glenn employees and retirees have volunteered their time and skills to build the playing field at the FIRST Buckeye Regional Robotics Competition at Cleveland State University's Wolstein Center.

The FIRST (For the Inspiration and Recognition of Science and Technology) Robotics Competition excites and inspires high school students by combining the thrill of sport with an opportunity to team with professional engineers and technicians to design and build a robot to compete worldwide. NASA has been a partner in FIRST since 1994.

Members of this year's field build crew included Glenn Facilities and Test Directorate staff Mark Bodziony, Sandra Buettner, Michael Depauw, Heather Graves (JSV) Joseph Harvey, Brent Konczol (SLI) and Jeff Swan; with Edith Parrott, Systems Engineering and Analysis Division; and NASA retirees Greg Schade and Steve Faldetta.

Each year the field crew assembles about 25 crates of components into a competitive playing field by working closely with the FIRST official in charge of assembly, teardown and shipping of arena components. This year, in recognition of the 2010 World Cup, the FIRST Program conceived Breakaway™, a game strategy and arena designed to resemble the game of soccer including the balls, goals and field.

The playing field for Breakaway™ was a 27- by 54-foot carpeted area, bounded by a 4-foot aluminum guardrail system with two 6-foot-high walls protecting player stations at each end. Five gates in the guardrail allowed easy entry and exit of robots between play. Speed bumps and tunnels divided the field into three regions: the red zone, the midfield and the blue zone. A 2-inch-wide white center line ran down the center. A tower, a ball return and two goals in each corner of the color-coded zones completed the field design.

"While there are some features, like floor dimension and carpeting, that carry over from year to year, it's important to understand the game strategy and any unique features of the floor design," Field Lead Swan explained. "The addition of speed bumps and gateway/tunnels made the build more interesting, but it also created additional challenges in maintenance due to debris from battle-weary robots."

The FIRST arenas are designed to withstand the rigors of play and frequent shipping. On average it takes anywhere from 4 to 6 hours to build a playing field. However, due to years of experience, Glenn's field crew completed it in less than 4 hours. The teardown, from field removal to loading the truck, was completed in less than 3 hours. This year's build also required a practice field be set up under the stands, to give teams a chance to work on their game tactics and strategies.

"Very few people see the magic that happens before anyone shows up, but there would be no event without the field team," said Carol Galica, Glenn's FIRST program manager. "They are key members of the NASA family of volunteers who help make FIRST such a success."

BY S. JENISE VERIS